

SEVEN NEW SPECIES OF *LIMNEPHILUS* FROM WESTERN NORTH
AMERICA WITH DESCRIPTION OF FEMALE OF *L. PALLENS*
(BANKS) (TRICHOPTERA, LIMNEPHILIDAE,
LIMNEPHILINAE, LIMNEPHILINI)

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Abstract.—*Limnephilus whiteheadi*, *innuitorum*, *chilcotinensis*, *isobela*, *uintah*, *chavas*, and *granti*, new species, are described. Males are figured for all, females also for *innuitorum*, *isobela*, *uintah*, and *chavas*. The male of *L. pallens* (Banks) is figured and rediagnosed, the female is figured and diagnosed for the first time.

Provenance of material examined ranges from the Arctic coast to New Mexico and Arizona.

Key Words: Trichoptera, Limnephilidae, *Limnephilus*, new species, North America

The material described here was accumulated over about ten years, from various sources (see acknowledgments). The most prolific source (the three USA species) was Don Denning (now deceased), of Moraga, California. He passed on to me the western United States material which he had accumulated over the years from various sources (a process reminiscent of insecticides in the food chain, without the toxic effects). The remainder of Denning's material will be dealt with later. Deposition of type material is given at the end of each species' treatment—all California Academy of Sciences material is from Denning.

Limnephilus whiteheadi, NEW SPECIES
Figs. 1-5

A member of the *asiaticus* group, this species appears closest to *L. labus* Ross.

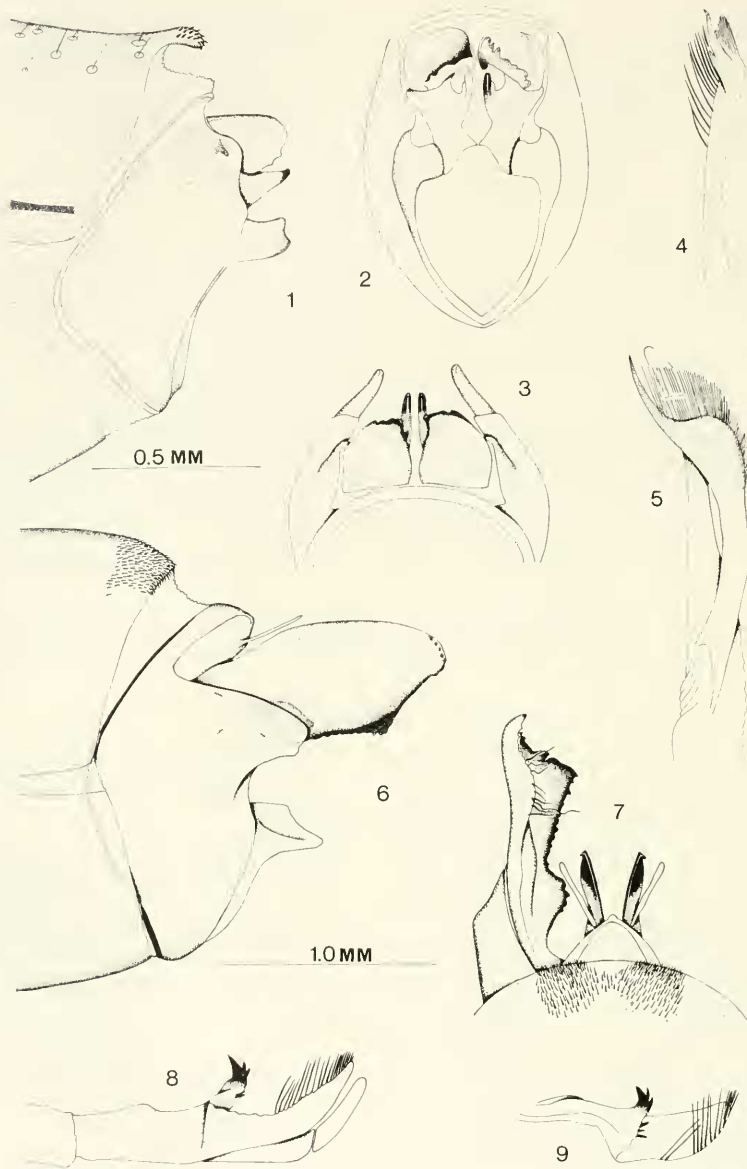
Description.—Fore-wing length 8.2 mm, red-brown; costal edge hyaline, otherwise faintly irrorate. Hind-wing hyaline. Antenna deep reddish brown, anterior face of scape glabrous. Vertex black. Spur formula 1, 3,

4; mesal member of hind-leg pairs longer than partner. Thorax black. Setae black overall.

Male genitalia.—(Specimen from Cowichan Lk., Vancouver Island, British Columbia, Canada). Distinguishable by black-tipped process at mesal edge of cercus base (Figs. 1-3); by intermediate sclerites of segment X directed posterad, triangular in lateral aspect, with only slightly upturned tip (Fig. 1); by clasper with long, very narrow base, with short, broadly blunt dorsal process directed posterad; by presence of small mesal process at dorso-median edge of tergum IX sparsely clothed with short, stout setae; and by aedeagus lateral arm terminated by long, tapered, blade-like process, and mesal face with two curved spines (Figs. 4, 5).

Female genitalia.—Unknown.

Material examined.—Holotype male: Cowichan Lk., Vancouver Island, British Columbia, Canada, 5/9/49, G. S. Brown. Deposited in the Spencer Museum, Dept of



Figs. 1-5. *L. whiteheadi* n. sp. Male genitalia. 1. Lateral aspect. 2. Caudal aspect. 3. Dorsal aspect. 4. Aedeagus, left lateral arm, dorsal aspect. 5. Aedeagus, lateral aspect.

Figs. 6-9. *L. chilcotinensis* n. sp. Male genitalia. 6. Lateral aspect. 7. Dorsal aspect (partial). 8. Aedeagus, lateral aspect. 9. Aedeagus, left lateral arm, tip, dorsal aspect.

Zoology, University of British Columbia,
Vancouver Canada.

This species named for Don Whitehead,
fellow graduate student, entomologist, and
philatelist, good friend and beer buddy.

Limnephilus chilcotinensis, NEW SPECIES
Figs. 6-9

A member of the *rhombicus* group, this
species appears closest to *L. rhombicus* L.

Description.—Fore-wing length indeterminate due to damage, overall red-brown, heavily patterned (but mostly lost as only specimen is heavily damaged about wings). Hind-wing hyaline. Antenna yellow-brown, anterior face of scape glabrous. Vertex uniform yellow-brown. Spurs 1, 3, 4. Thorax orange-brown overall.

Male genitalia.—(Specimen from Alexis Lk., W Williams Lake, British Columbia, Canada). Distinguishable by massive cercus projected posterad, with toothed, heavily sclerotised ventral edge (Fig. 6) sinuate in dorsal aspect (Fig. 7); by short, squat intermediate appendages of segment X not visible in lateral aspect (Fig. 6), directed posterad; by wide dorsal strap of segment IX, with pair of membranous processes at postero-mesal edge; by aedeagus with tip turned rather sharply dorsad (Fig. 8); and by aedeagus lateral arm with heavily sclerotised process at mid-point, directed dorso-anterad in lateral aspect, meso-anterad in dorsal aspect (Fig. 9), with several short, black spines on mesal surface.

Female genitalia.—Unknown.

Material examined.—Holotype male, Alexis Lk., interior plateau west of Watson Lake, British Columbia, Canada, 24/6/78, J. R. Spence. Deposited in the Royal Ontario Museum, Toronto, Canada.

This species is named for The Chilcotin, the interior plateau ranching country of British Columbia, wherein is located Alexis Lk.

Limnephilus granti, NEW SPECIES

Figs. 10–13

A member of the *assimilis* group, this species appears closest to *L. parvulus* (Banks).

Description.—Fore-wing length 11.9 mm, pale orange-brown with large transparent areas grouped about chord, and in post-costal area. Hind-wing hyaline. Antenna yellow-brown, anterior face of scape glabrous. Vertex dark reddish brown, warts cream. Spurs 1, 2, 2. Legs brownish yellow; fore-leg femur with insignificant brush of short,

stout pegs at proximal end of postero-mesal edge. Thorax dark reddish brown dorsally, yellow-brown laterally; warts cream.

Male genitalia.—(Specimen from Grant Ck, Graham County, Arizona). Distinguishable by massive, triangular intermediate appendages of segment X (Fig. 10), with finely toothed dorsal edge (Figs. 10, 12); by short, blunt, rounded process dorsally on mesal face of cercus (Figs. 10, 11); by clasper, in lateral aspect, thumblike, with short, narrow basal portion; by lightly hirsute postero-dorsal edge of tergum IX; and by aedeagus stout, with lateral arm stout, simple, distally fringed by thick setae (Fig. 13).

Female genitalia.—Unknown.

Material examined.—Holotype male, Grant Ck, Hospital Flat campground, Graham Mountains, Graham County, Arizona, USA, 5/6/82, R. W. Bauman. Deposited in the California Academy of Sciences, San Francisco, USA.

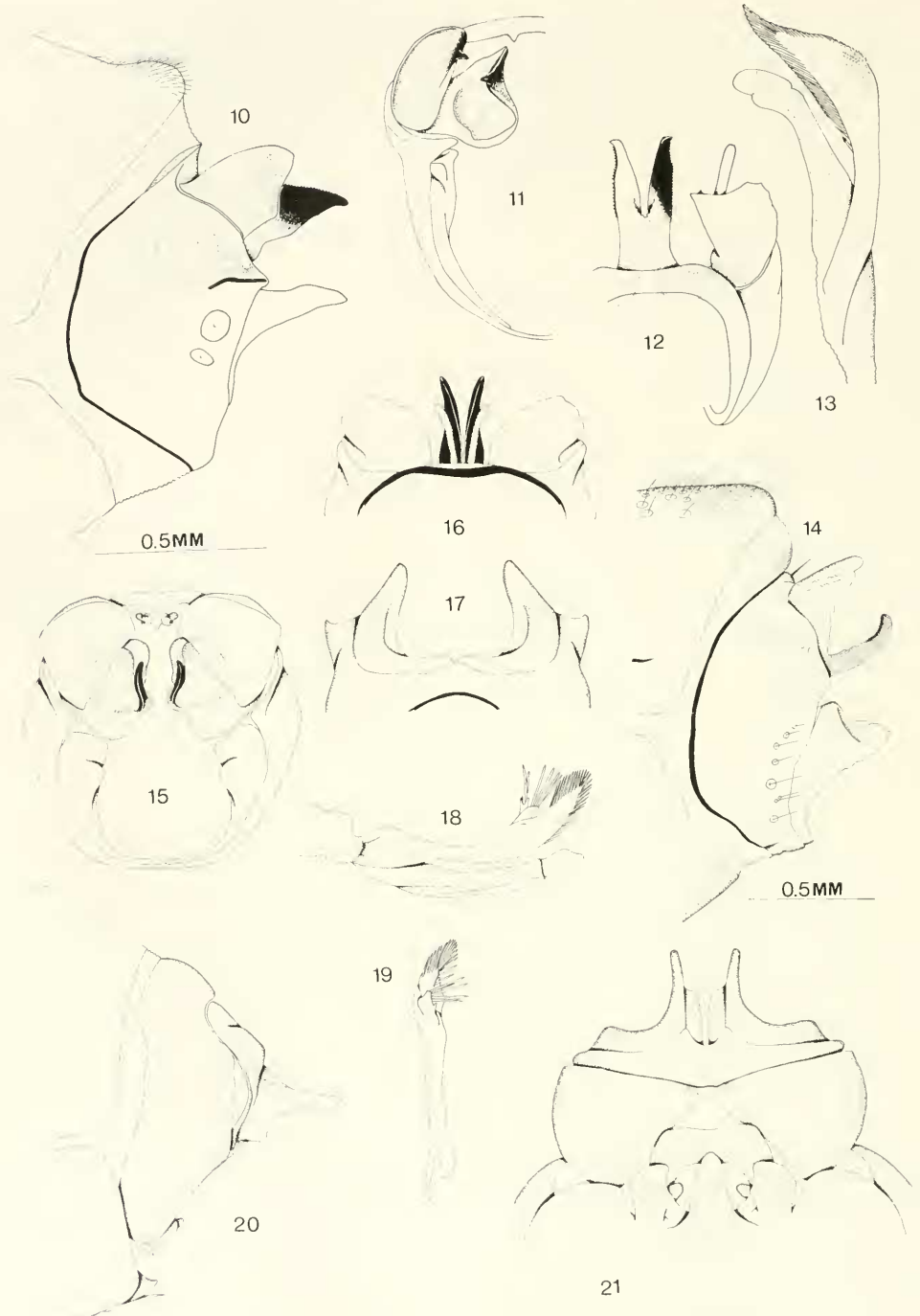
This species is named for Grant Ck.

Limnephilus innuitorum, NEW SPECIES

Figs. 14–21

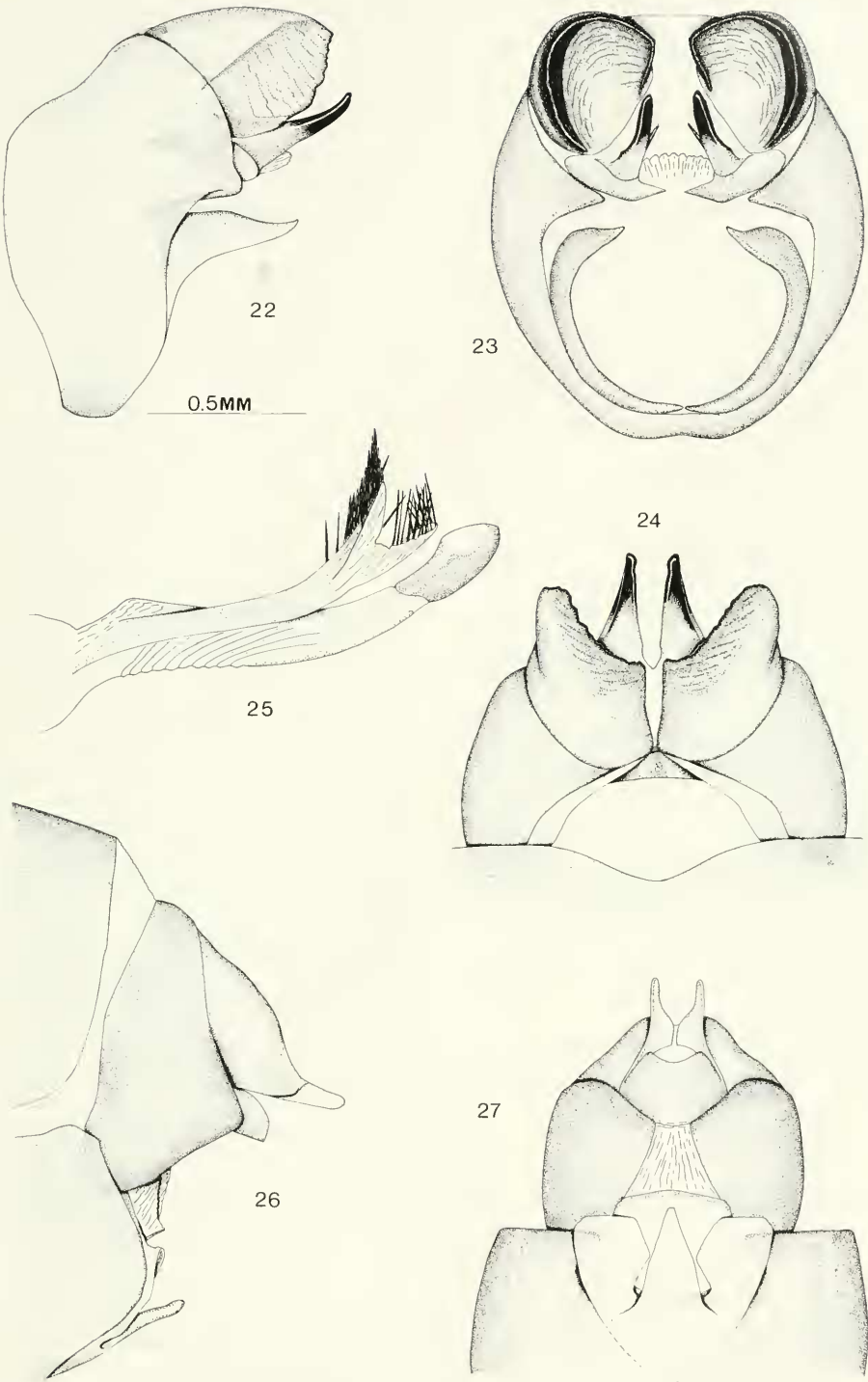
Schmid (1955) did not assign *L. argenteus* Banks to a group. I described (Nimmo 1977) *L. vernalis* which is clearly closely related to *argenteus*. This species is a third member of the *argenteus* group, though somewhat isolated within the group.

Description.—Fore-wing length 11 mm (female slightly larger), translucent dark brown, sparsely, faintly irrorate. Hind-wing translucent, faintly yellowish (darker in female). Antenna deep reddish brown, anterior face of scape brownish cream, glabrous. Vertex dark brown to almost black, with paler, yellowish brown areas adjacent to compound eyes (in female not so dark, more mottled with dark and pale areas). Spurs 1, 3, 4, disto-mesal spur of hind leg longer than partner (equal in female). Thorax mottled very dark brown and paler reddish brown (female paler overall, with brownish cream areas).



Figs. 10-13. *L. granti* n. sp. Male genitalia. 10. Lateral aspect. 11. Caudal aspect (partial). 12. Dorsal aspect (partial). 13. Aedeagus, lateral aspect.

Figs. 14-21. *L. innuitorum* n. sp. Male genitalia. 14. Lateral aspect. 15. Caudal aspect. 16. Dorsal aspect. 17. Ventral aspect (partial). 18. Aedeagus, lateral aspect. 19. Aedeagus, right lateral arm, dorsal aspect. Female genitalia. 20. Lateral aspect. 21. Ventral aspect.



Figs. 22-27. *L. isobela* n. sp. Male genitalia. 22. Lateral aspect. 23. Caudal aspect. 24. Dorsal aspect. 25. Aedeagus, lateral aspect. Female genitalia. 26. Lateral aspect. 27. Ventral aspect.

Male genitalia.—(Specimen from near Tuktoyaktuk, Northwest Territories, Canada). Distinguishable by slender intermediate appendage curved dorsad, with fine serration along distal half of dorsal edge (Fig. 14); by massive clasper with concave postero-dorsal surface on dorsal process, and fairly wide tapered base extended to meso-ventral edge of segment IX (Figs. 14, 15, 17); by long, slender pair of membranous lobes projected from dorso-mesal area of segment IX, between cerci (Figs. 14, 16); and by lateral arms of aedeagus complex distally, with process on mesal face, proximal of tip, with several long, heavy, pale setae (Figs. 18, 19).

Female genitalia.—(Specimen from near Tuktoyaktuk, Northwest Territories, Canada). Distinguishable by roughly triangular appearance in lateral aspect (Fig. 20), with high, wide segment IX tapered toward segment X, which is tapered to correspond, to a final point; by complex vulval scale (Fig. 21) of widely separated lateral lobes, smaller rounded peg-like mesal lobes, and large triangular median lobe.

Material examined.—Holotype male, 'lower stream site,' NE Tuktoyaktuk, Northwest Territories, Canada, 30/6/83, N. Winchester. Allotype female, same data (this specimen fragmentary). Paratype males: 2, same data; 2, same data but 2/7/83; 1, same data but collected as a larva 19/8/81, emerged 6/1/81(=82?).

This species is named for the Innuite people native to the Canadian arctic regions.

Limnephilus isobela, NEW SPECIES

Figs. 22–27

A member of the *alberta* group, this species is closest to *L. kalama* Denning.

Description.—Fore-wing length 13.5 mm, yellowish brown with scattered hyaline spots, especially about veins; larger hyaline areas in distal ends of f1, f3, and f5, about chord and at mid-points of subradial and thyridial cells (female more hyaline, especially in anterior cells). Hind-wing hyaline to pale straw. Antenna chocolate-brown, anterior face of scape glabrous. Vertex very deep chocolate-brown to black, no pattern. Spurs 1, 3, 4, meso-proximal spur of female middle leg much shorter than others; all pale yellowish brown. Thorax deep chocolate brown to almost black. Legs deep yellow-brown.

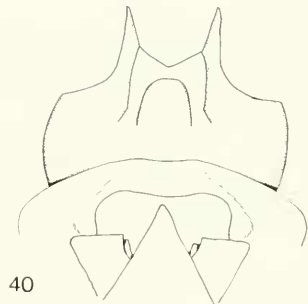
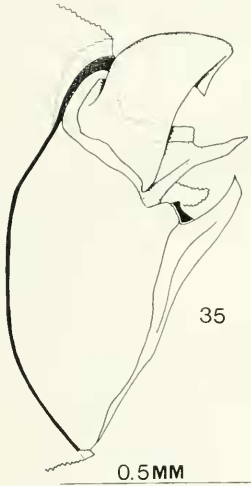
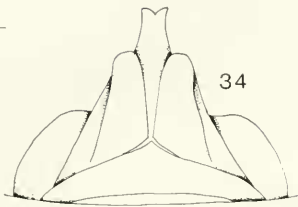
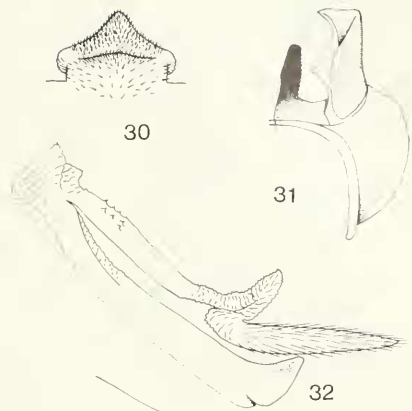
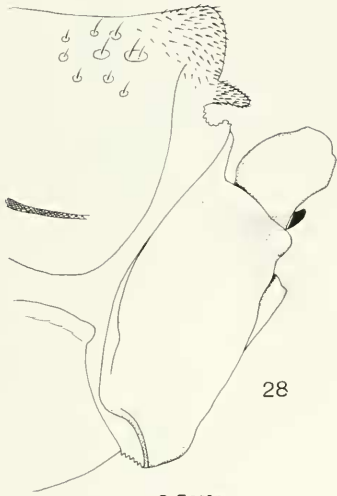
Male genitalia.—(Specimen from Isobel Pass, Richardson Hwy, Yukon, Canada). Distinguishable by inconspicuous dorsal strap of massive segment IX (Fig. 22); by dorsal half of segment IX directed postero-dorsad such that cerci and intermediate appendages project well posterad of claspers; by massive cercus with concave mesal face (Fig. 23); by posterior edge of tergum VIII slightly indented, not clothed in setae (Fig. 24); by intermediate appendage slender, gently curved postero-dorsad, without dentitions (Fig. 22), acute-triangular in dorsal aspect (Fig. 24); and by lateral arms of aedeagus bifid distally, each branch heavily fringed with stout, long setae (Fig. 25).

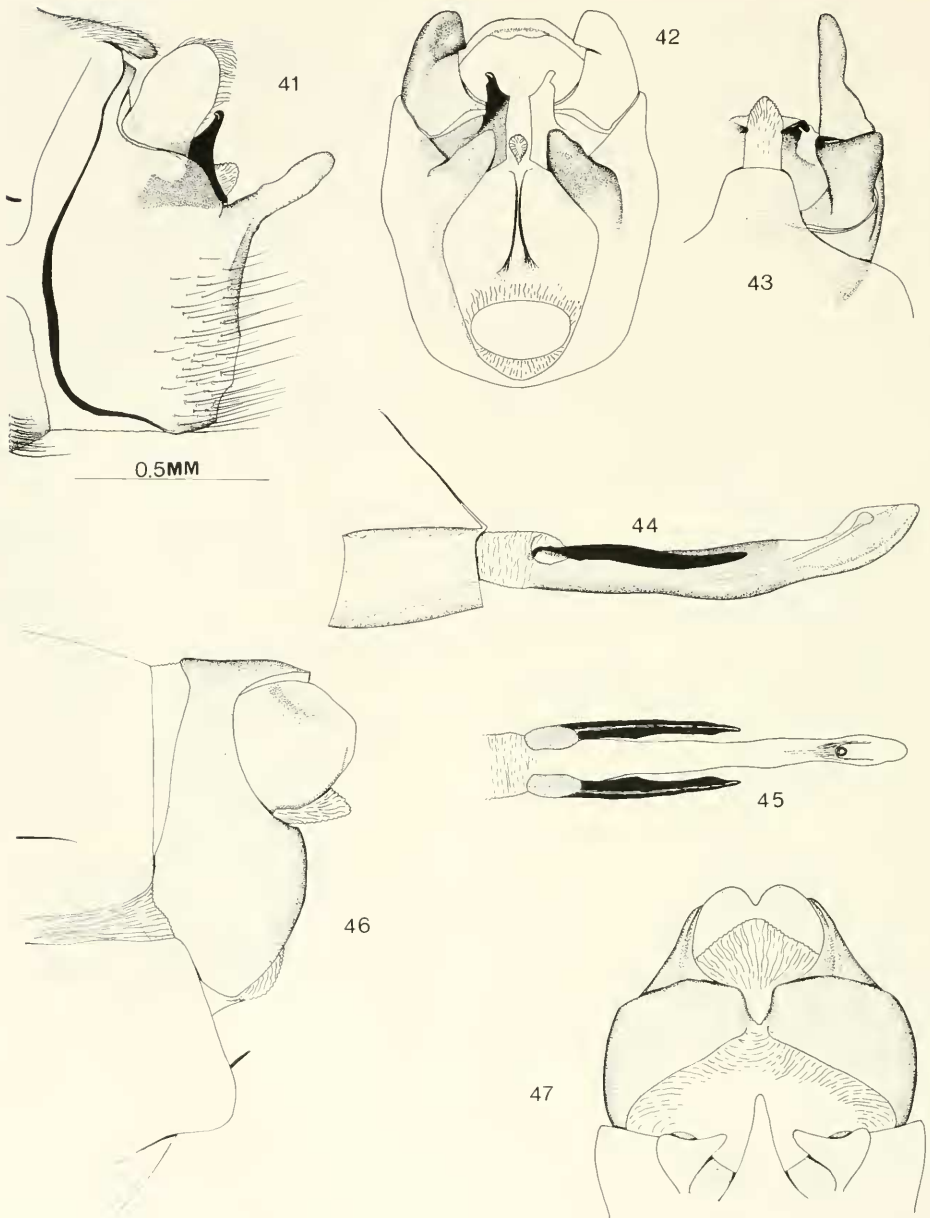
Female genitalia.—(Specimen from Isobel Pass, Richardson Hwy, Yukon, Canada). Distinguishable by massive, triangular vulval scale (Fig. 27), with lateral lobes angular, median lobe acute-triangular; by massive segment IX tapered dorsad (Fig. 26); and by segment X tapered posterad, with sharp declivity at mid-point, to pair of finger-like processes (Fig. 27).

Material examined.—Holotype male, Isobel Pass, mi. 206, Richardson Hwy, Yu-

Figs. 28–34. *L. uintah* n. sp. Male genitalia. 28. Lateral aspect. 29. Caudal aspect (partial). 30. Dorsal aspect of tergum VIII posterior edge (partial). 31. Dorsal aspect of segments IX & X (partial). 32. Aedeagus, lateral aspect. Female genitalia. 33. Lateral aspect. 34. Dorsal aspect.

Figs. 35–40. *L. chavas* n. sp. Male genitalia. 35. Lateral aspect. 36. Caudal aspect (partial). 37. Dorsal aspect (partial). 38. Aedeagus, lateral aspect. Female genitalia. 39. Lateral aspect. 40. Ventral aspect.





Figs. 41-47. *L. pallens* (Banks). Male genitalia. 41. Lateral aspect. 42. Caudal aspect. 43. Dorsal aspect (partial). 44. Aedeagus, lateral aspect. 45. Aedeagus, dorsal aspect. Female genitalia. 46. Lateral aspect. 47. Ventral aspect.

kon, Canada, 13/7/62, R. E. Leech. Allotype female, same data as holotype. Deposited in the Canadian National Collection, Biosystematics Research Centre, Agriculture Canada, Ottawa, Canada.

This species is named for Isobel Pass.

Limnephilus uintah, NEW SPECIES

Figs. 28-34

This species is the third member of the *sericeus* group.

Description.—Fore-wing length 8.2 mm

(female larger), dark chocolate, uniformly irrorate, with scattered larger hyaline areas. Hind-wing uniformly very pale, translucent brown. Antenna uniformly brown, scape darker, with anterior face glabrous (and cream in female). Vertex dark chocolate-brown, warts very little paler. Spurs 1, 3, 3. Thorax dark chocolate-brown, pro- and meso-thoracic warts paler. Legs paler, shaded to grey-brown distally.

Male genitalia.—(Specimen from Battleship Bog, Uintah County, Utah, USA). Distinguishable by postero-dorsal edge of tergum IX developed, with ventral process directed posterad (Fig. 28) (rather like side view of a cap), rounded-triangular in dorsal aspect (Fig. 30); by cercus rectangular but with slight bend (Fig. 28), with finger-like process at ventro-distal corner (Fig. 29); by intermediate appendages short, curved slightly postero-dorsad (Fig. 28), rather stout in dorsal aspect (Fig. 31) with coarse dentitions along lateral edge; and by aedeagus heavy, expanded slightly distally with tip turned dorsad (Fig. 32), with simple membranous lateral arm hirsute at tip.

Female genitalia.—(Specimen from Battleship Bog, Uintah County, Utah, USA). Distinguishable by cerci large, roughly uniformly wide (Fig. 33), somewhat tapered distally in dorsal aspect (Fig. 34); by segment X a slightly curved tube (Fig. 33) with distal edge indented laterally to give slender upper process, and short, blunt ventral process; and by dorsal process weakly bifid in dorsal aspect (Fig. 34).

Material examined.—Holotype male, Sims Peak potholes, Battleship Bog, Uintah County, Utah, USA, 22/8/83, R. W. Bauman. Allotype female, same data as holotype. Paratype female, same data. Deposited in California Academy of Sciences, San Francisco, USA.

This species is named for Uintah County.

***Limnephilus chavas*, NEW SPECIES**

Figs. 35–40

A member of the *incisus* group, this species is closest to *taloga* Ross.

Description.—Fore-wing length 10.2 mm (female larger), translucent reddish brown, no evident pattern. Hind-wing hyaline. Antenna grey-brown, scape paler. Vertex dark brown in ocellar triangle, paler peripherally. Spurs 0, 2, 3 (female 1, 2, 3). Legs grey-brown, male with dense brush of short, black spines along front leg postero-mesal femur. Thorax dark chocolate-brown dorsally, yellow-brown laterally, warts paler yellowish brown.

Male genitalia.—(Specimen from Bob Crosby Draw, Chavas County, New Mexico, USA). Distinguishable by cercus raised notably dorsad of main body of segment IX (Fig. 35), directed dorsad, with distinct tooth at disto-mesal angle; by intermediate appendages slight, acicular, directed posterad, with distinct cap of membrane above base (Figs. 35–37); by aedeagus tip well separated from main shaft by area of membrane, with three distinct spines on ventral surface (Fig. 38); and by aedeagus lateral arm base wide, rapidly tapered to long, narrow curved blade, with 4 spines placed along mesal surface of proximal half.

Female genitalia.—(Specimen from Bob Crosby Draw, Chavas County, New Mexico, USA). Distinguishable by vulval scale median lobe massive, triangular (Fig. 40), with lateral lobes inverted triangular but minus mesal angle; by segment IX divided to tergal and sternal portions (Fig. 39) separated by membranous gap; and by segment X a complex overlapping of short, longer, pointed, and blunt processes (Fig. 39).

Material examined.—Holotype male, Bob Crosby Draw, Chavas County, New Mexico, USA, 16/3/83 (as pupa, emerged 30/3/83), E. Tackea. Allotype female, same data as holotype. Paratype female, same data. Deposited in California Academy of Sciences, San Francisco, USA.

This species is named for Chavas County.

***Limnephilus pallens* (Banks)**

Figs. 41–47

Description.—Fore-wing length 7.6 mm, hyaline with overall greyish cast, no stigma,

venation typical for *Limnephilus*. Hind-wing hyaline. Female fore-wing red-brown overall, no pattern; hind-wing lacks cross-veins R3-R4, R5-M2, and M2-M3+4; individual aberrations occur, such as fading out of veins at wing edges, and rejoining of veins basad of wing edges. Antenna dull grey-brown, scape somewhat darker. Vertex dull grey-brown, except sutures darker, warts barely distinguishable. Spurs 0, 2, 2 or 0, 2, 3 (female 0, 2, 4). Male front-leg femur distomesal edge with semi-circular excision with two strong, black setae set very close together along anterior edge of excision, roughly parallel to long axis of femur—these bear some resemblance to spurs but appear not to be. Female front leg femur 'normal,' with distal spur, but also with two strong, black setae at right angles to long axis of femur. Thorax dull grey-brown with darker sutures, warts barely distinguishable.

Male genitalia.—(Specimen from Kluane National Park, Yukon, Canada). Distinguishable by presence of finely hirsute process directed posterad from postero-dorsal edge of tergum VIII (Figs. 41, 43); by finger-like clasper directed postero-dorsad from wide base along entire height of main body of segment IX (base poorly delimited from segment IX) (Figs. 41, 42); by cercus short, rounded, directed dorsad (Fig. 41), with large tooth-like process directed mesad from disto-mesal face (Fig. 42); by aedeagus scoop-like, with tip not differentiated from main body (Fig. 44); and by lateral arms of ae-

deagus short, heavily sclerotised, blade-like (Figs. 44, 45).

Female genitalia.—(Specimen from Kluane National Park, Yukon, Canada). Distinguishable by lobes of vulval scale slender, well separated (Fig. 47); by segment IX massive, constricted laterally just below dorsal surface (Fig. 46); and by segment X simple, almost circular (Fig. 46).

Material examined.—Several males and females, Kluane National Park, Yukon, Canada, dates unknown, R. Wickstrom. Deposited in Strickland Museum, Dept of Entomology, University of Alberta, Edmonton, Canada.

ACKNOWLEDGMENTS

I am most grateful to the following for providing the material recorded here: D. G. Denning, Moraga, California (deceased); N. Winchester, Victoria, British Columbia; the Canadian National Collection, Agriculture Canada, Ottawa, Ontario; R. Wickstrom, Winnipeg, Manitoba; S. Cannings, University of British Columbia, Vancouver, British Columbia; and J. Spence, University of Alberta, Edmonton, Alberta.

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